

CLAIMS

1. A heat dissipation type semiconductor package including a die paddle, a semiconductor chip mounted on the die paddle, and a lead frame, comprising:

5 a plurality of wires electrically connecting bond pads formed on the semiconductor chip and inner leads in the lead frame;

a heat-radiating canopy attached to a top surface of the semiconductor chip; and  
molding material surrounding all of the die paddle, the semiconductor chip, the inner leads and a bottom surface of the heat-radiating canopy;

10 wherein the top surface of the heat-radiating canopy is exposed to the exterior, and  
a portion of the surface of the heat-radiating canopy being in contact with the semiconductor chip is recessed.

2. The heat dissipation type semiconductor package according to claim 1, wherein the  
15 heat-radiating canopy is attached to an active area of the top surface of the semiconductor  
chip.

3. The heat dissipation type semiconductor package according to claim 2, wherein the  
heat-radiating canopy has a round shape or a polygonal shape depending on the shape of  
20 the semiconductor package.

4. The heat dissipation type semiconductor package according to claim 1, wherein the  
heat-radiating canopy is made of a material selected from a group consisting of thermal  
conductive materials, electrically conductive materials and an arbitrary combination  
25 thereof.

5. The heat dissipation type semiconductor package according to claim 1, wherein an  
edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor  
package.

6. The heat dissipation type semiconductor package according to claim 1, wherein an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom surface of the semiconductor package.

5 7. The heat dissipation type semiconductor package according to claim 1, further comprising an external heat slug attached to the exposed top surface of the heat-radiating canopy.

10 8. The heat dissipation type semiconductor package according to claim 1, wherein the exposed top surface of the heat-radiating canopy is formed with a plurality of projections thereon.

9. The heat dissipation type semiconductor package according to claim 1, wherein the heat-radiating canopy is plated.

15 10. A heat dissipation type semiconductor package including a substrate, a die paddle formed on the substrate, a semiconductor chip mounted on the die paddle, and inner leads attached to the substrate and serving as electrical contacts, comprising:

20 a plurality of wires electrically connecting bond pads formed on the semiconductor chip and the inner leads;

a heat-radiating canopy attached to a top surface of the semiconductor chip;

a molding material surrounding all of the die paddle, the semiconductor chip, the inner lead and a bottom surface of the heat-radiating canopy; and

25 solder balls mounted on a bottom surface of the substrate and serving as electrical inputs/outputs;

wherein the top surface of the heat-radiating canopy is exposed to the exterior, and a portion of the surface of the heat-radiating canopy being in contact with the semiconductor chip is recessed.

30 11. The heat dissipation type semiconductor package according to claim 10, wherein

the heat-radiating canopy is attached to an active area in the top surface of the semiconductor chip.

12. The heat dissipation type semiconductor package according to claim 11, wherein  
5 the heat-radiating canopy has a round shape or a polygonal shape depending on the shape  
of the semiconductor package.

13. The heat dissipation type semiconductor package according to claim 10, wherein  
10 the heat-radiating canopy is made of a material selected from a group consisting of thermal  
conductive materials, electrically conductive materials and an arbitrary combination  
thereof.

14. The heat dissipation type semiconductor package according to claim 10, wherein  
15 an edge of the heat-radiating canopy is curved toward a bottom surface of the  
semiconductor package.

15. The heat dissipation type semiconductor package according to claim 10, wherein  
an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom  
surface of the semiconductor package.

20 16. The heat dissipation type semiconductor package according to claim 10, further  
comprising an external heat slug attached to the exposed top surface of the heat-radiating  
canopy.

25 17. The heat dissipation type semiconductor package according to claim 10, wherein  
the exposed top surface of the heat-radiating canopy is formed with a plurality of  
projections thereon.

30 18. The heat dissipation type semiconductor package according to claim 10, wherein the  
heat-radiating canopy is plated.

19. A method of fabricating a heat dissipation type semiconductor package, comprising the steps of:

5 attaching a semiconductor chip to a die paddle of a lead frame of a semiconductor package;

connecting bond pads on the semiconductor chip and inner leads in the lead frame by means of wires;

attaching a heat-radiating canopy to a top surface of the semiconductor chip;

10 performing a molding in such a manner that a top surface of the heat-radiating canopy is exposed to the exterior; and

trimming and forming out leads in the semiconductor package obtained after completion of the molding so as to form I/O terminals of the semiconductor package.

20. The method according to claim 19, wherein the semiconductor chip attaching step

15 comprises the step of attaching the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.

21. The method according to claim 19, wherein the wires are made of any one of gold, copper, aluminum, and an arbitrary combination thereof.

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22. The method according to claim 19, wherein a central portion of the heat-radiating canopy is recessed so that a portion of the heat-radiating canopy, which is located above the top surface of the semiconductor chip, is in contact with the semiconductor chip and the remaining portions of the heat-radiating canopy are not in contact with the semiconductor chip.

25. The method according to claim 22, wherein, when the heat-radiating canopy is attached to the top surface of the semiconductor chip, the heat-radiating canopy is caused to be in contact with an active area of the semiconductor chip.

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24. The method according to claim 22, wherein the heat-radiating canopy is made of a material selected from a group consisting of thermal conductive materials, electrically conductive materials and an arbitrary combination thereof.

5 25. The method according to claim 19, wherein the heat-radiating canopy has a round shape or a polygonal shape depending on the shape of the semiconductor package.

26. The method according to claim 19, wherein an edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor package.

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27. The method according to claim 19, wherein an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom surface of the semiconductor package.

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28. The method according to claim 19, wherein the heat-radiating canopy attaching step comprises a step of attaching the heat-radiating canopy to the top surface of the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.

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29. The method according to claim 28, wherein the adhesive is selected from a group consisting of thermo-plastic adhesive epoxy, thermo-set adhesive epoxy, thermal conductive epoxy, electrically conductive epoxy, an adhesive tape, and an arbitrary combination thereof.

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30. The method according to claim 19, further comprising a step of forming a plurality of projections on the exposed surface of the heat-radiating canopy.

31. The method according to claim 19, further comprising a step of attaching an external heat slug to the exposed surface of the heat-radiating canopy.

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32. The method according to claim 19, further comprising a step of performing a post-

mold curing process using an electric oven, after the molding step.

33. The method according to claim 19, further comprising a step of polishing or defleshing the exposed surface of the heat-radiating canopy.

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34. The method according to claim 19, further comprising a step of plating the out leads or the exposed surface of the heat-radiating canopy.

35. A method of fabricating a heat dissipation type semiconductor package,  
10 comprising the steps of:

forming a die paddle and inner leads on a substrate;  
attaching a semiconductor chip to the die paddle;  
connecting bond pads on the semiconductor chip and the inner leads by means of wires;

15 attaching a heat-radiating canopy to a top surface of the semiconductor chip by means of an adhesive;

performing a molding in such a manner that a top surface of the heat-radiating canopy is exposed to the exterior; and

20 forming solder balls on a bottom surface of the semiconductor package after completion of the molding step.

36. The method according to claim 35, wherein the semiconductor chip attaching step comprises a step of attaching the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.

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37. The method according to claim 35, wherein the wires are made of any one of gold, copper, aluminum, and an arbitrary combination thereof.

38. The method according to claim 35, wherein a central portion of the heat-radiating canopy is recessed so that a portion of the heat-radiating canopy, which is located above

the top surface of the semiconductor chip, is in contact with the semiconductor chip and the remaining portions of the heat-radiating canopy are not in contact with the semiconductor chip.

5 39. The method according to claim 38, wherein, when the heat-radiating canopy is attached to the top surface of the semiconductor chip, the heat-radiating canopy is caused to be in contact with an active area of the semiconductor chip.

10 40. The method according to claim 35, wherein the heat-radiating canopy is made of a material selected from a group consisting of thermal conductive materials, electrically conductive materials and an arbitrary combination thereof.

41. The method according to claim 35, wherein the heat-radiating canopy has a round shape or a polygonal shape depending on the shape of the semiconductor package.

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42. The method according to claim 35, wherein an edge of the heat-radiating canopy is curved toward a bottom surface of the semiconductor package.

20 43. The method according to claim 35, wherein an edge of the heat-radiating canopy is formed with a portion protruding toward a bottom surface of the semiconductor package.

25 44. The method according to claim 35, wherein the heat-radiating canopy attaching step comprises a step of attaching the heat-radiating canopy to the top surface of the semiconductor chip by means of an adhesive and then curing the adhesive using an electric oven or a heater block.

30 45. The method according to claim 44, wherein the adhesive is selected from a group consisting of thermo-plastic adhesive epoxy, thermo-set adhesive epoxy, thermal conductive epoxy, electrically conductive epoxy, an adhesive tape, and an arbitrary combination thereof.

46. The method according to claim 35, further comprising a step of attaching an external heat slug to the exposed surface of the heat-radiating canopy.

5 47. The method according to claim 35, further comprising a step of performing a post-mold curing process using an electric oven, after the molding step.

48. The method according to claim 35, further comprising a step of polishing or defleshing the exposed surface of the heat-radiating canopy.

10 49. The method according to claim 35, further comprising a step of plating the out leads or the exposed surface of the heat-radiating canopy.

50. The method according to claim 35, further comprising a step of forming a plurality of projections on the exposed surface of the heat-radiating canopy.  
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